WHAT IS CLAIMED IS:

1. An antenna comprising:

a first region having a first refractive index; and

a second region having a negative refractive index, said second region substantially surrounding said first region, such that radiation outside said second region is reproduced in said first region.

2. An antenna as defined in Claim 1, wherein said first region has a positive refractive index.

3. An antenna as defined in Claim 1, wherein the refractive index of said second region effectively cancels out the optical properties of said first region.

4. An antenna as defined in Claim 1, wherein said first region comprises:

a first cylinder;

and wherein said second region comprises:

a second cylinder substantially surrounding said first cylinder.

5. An antenna as defined in Claim 4, wherein the length of said first cylinder and said second cylinder is relatively long compared with the wavelength of radiation to be reproduced in said first region.

6. An antenna as defined in Claim 4, wherein said first cylinder has a radius of r_3 and wherein said second cylinder has a radius of r_2, and wherein the refractive index n of said first cylinder is $n = r_2^2 / r_3^2$.

7. An antenna as defined in Claim 4, wherein said first cylinder has a radius of r_3 and said second

cylinder has a radius of r_2, and wherein the electrical permittivity ε of said first and second cylinders are as follows:

$$\varepsilon_x = +1, \quad \varepsilon_y = +1, \quad \varepsilon_z = +1, \qquad r > r_2$$

$$\varepsilon_x = -1, \quad \varepsilon_y = -1, \quad \varepsilon_z = -r_2^4 / r^4, \qquad r_3 < r < r_2$$

$$\varepsilon_x = +1, \quad \varepsilon_y = +1, \quad \varepsilon_z = +r_2^4 / r_3^4 = +r_1^2 / r_3^2, \qquad r < r_3$$

the magnetic permeability μ being equal to the electrical permittivity ε.

8. An antenna as defined in Claim 4, wherein said first cylinder has a radius of r_3 and said second cylinder has a radius of r_2, and wherein said antenna reproduces radiation in an area of radius r_1 outside said second cylinder, where $r_1 > r_2$, wherein $\frac{r_2^2}{r_3} = r_1$.

9. An antenna as defined in Claim 1, wherein said first region comprises:

a sphere; and

wherein said second region comprises:

a second sphere substantially enclosing said first sphere.

10. An antenna as defined in Claim 9, wherein said first sphere has a radius of r_3 and wherein said second sphere has a radius of r_2, and wherein the electrical permittivity ε of said first and second spheres are as follows:

$$\varepsilon_x = \varepsilon_y = \varepsilon_z = +\frac{r_2^2}{r_3^2}, \qquad 0 < r < r_3$$

$$\varepsilon_x = \varepsilon_y = \varepsilon_z = -\frac{r_2^2}{r^2}, \qquad r_3 < r < r_2$$

$$\varepsilon_x = \varepsilon_y = \varepsilon_z = +1, \qquad r_2 < r < \infty$$

and the magnetic permeability μ is equal to the electrical permittivity ε.

11. An antenna as defined in Claim 1, wherein said antenna comprises a narrow beam antenna.

12. A method of producing an antenna comprising:

providing a first region having a first refractive index; and

providing a second region having a negative refractive index, said second region substantially surrounding said first region, such that radiation outside said second region is reproduced in said first region.

13. A method as defined in Claim 12, wherein said first region has a positive refractive index.

14. A method as defined in Claim 12, wherein the refractive index of said second region effectively cancels out the optical properties of said first region.

15. A method as defined in Claim 12, wherein said providing said first region step comprises:

providing a first cylinder;

and wherein said providing said second region step comprises:

providing a second cylinder substantially surrounding said first cylinder.

16. A method as defined in Claim 12, wherein said providing said first region step comprises:

providing a sphere; and

and wherein said providing said second region step comprises:

providing a second sphere substantially enclosing said first sphere.

17. A method as defined in Claim 12, wherein said antenna comprises a narrow beam antenna.

18. A narrow beam antenna comprising:

a first region having a first refractive index which is positive; and

a second region having a negative refractive index, said second region substantially surrounding said first region, such that radiation outside said second region is reproduced in said first region, wherein the refractive index of said second region effectively cancels out the optical properties of said first region.

19. A method as defined in Claim 18, wherein said first region comprises:

a first cylinder;

and wherein said second region comprises:

a second cylinder substantially surrounding said first cylinder.

20. A method as defined in Claim 18, wherein said first region comprises:

a sphere; and

wherein said second region comprises:

a second sphere substantially enclosing said first sphere.